Department of Electrical and Computer Engineering  
EENG 303  
ELECTRONICS DESIGN I  
☑ Required ☐ Elective

<table>
<thead>
<tr>
<th>AY</th>
<th>Revision History: Changes and Rationale</th>
<th>Progress Exam Affected?</th>
</tr>
</thead>
<tbody>
<tr>
<td>07/08</td>
<td>Syllabus Created</td>
<td>N</td>
</tr>
<tr>
<td>13/14</td>
<td>Syllabus Updated</td>
<td>N</td>
</tr>
<tr>
<td>14/15</td>
<td>Syllabus Updated</td>
<td>N</td>
</tr>
</tbody>
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Coordinator: Steven D. Schennum, Associate Professor, Electrical and Computer Engineering

Catalog Description: Introduction to electronics design concepts; semiconducting devices and their associated electrical behavior; amplifier modeling, design, and trade-offs; practical designing, building, testing, and analyzing of electronic circuits. Three hours lecture per week. Prerequisite: EENG 201. Corequisite: EENG 202.

Prerequisites by Topic:
1. Differential equations.
2. Circuit analysis

Textbook(s) / Require Mat’l:  

Course Topics:
1. Op-amp circuits. 10%
2. Semiconductor Physics. 10%
3. Diodes and applications. 10%
4. Biasing transistors. 12%
5. AC modeling and amplifier design. 40%
6. Circuit simulation tools. 5%
7. Examinations. 13%

Course Objectives:
1. To understand the principles of operation of common electronic devices
2. To learn to use appropriate device models in designing and analyzing electronic circuits
3. To learn to design electronic circuits using diodes, transistors, and integrated circuits
4. To understand the nature of the trade-offs and selection processes in electronic circuit development
5. To learn to use simulation tools for analyzing electronic circuits
**Professional Components/Course Outcomes:**

By the end of this course the student will be able to:

1. demonstrate knowledge of electrical characteristics and applications of transistors, zener diodes, avalanche diodes, and op amps.
2. demonstrate the ability to design and evaluate the performance of transistor circuits and diode circuits.

**Class/Lab Schedule:**

150 minutes of lecture each week; 3 x 50 minute or 2 x 75 minute sessions
3 credit hours

**Relation to Program Outcomes:**

- ✔ (a) Fundamental math, science, or engineering
- ✔ (b) Experimentation
- ✔ (c) Design
- ✔ (d) Teamwork
- ✔ (e) Problem solving
- (f) Professional ethics
- (g) Communication
- (h) Global awareness
- (i) Life-long learning
- (j) Contemporary issues
- ✔ (k) Modern tools

**Computer Tools:**

Circuit simulation software (i.e. MATLAB, SPICE, etc.)

**Laboratory Content:**

See EENG 303L

**Design Content:**

Design issues are addressed.

**Relation to Curriculum:**

<table>
<thead>
<tr>
<th>Curricular Component</th>
<th>Elect. Power/Power Syst.</th>
<th>Computer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math/Science</td>
<td>EM/Circuits/Elect./Filters</td>
<td>Controls/Automation</td>
</tr>
<tr>
<td>Design</td>
<td>Comm. Syst./Signal Proc.</td>
<td>Other Engineering</td>
</tr>
<tr>
<td>Foundational</td>
<td>Intermediate</td>
<td>Advanced</td>
</tr>
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Coordinator: Steven D. Schennum, Associate Professor, Electrical and Computer Engineering

Catalog Description: Three hours laboratory per week. Co-requisite: EENG 303.

Prerequisites by Topic:
1. Differential equations.
2. Circuit analysis.

Textbook(s) / Require Mat'l:

Course Topics:
1. Op-amp circuits and limitations 20%
2. Diode characteristics and applications 20%
3. Power supply circuits 10%
4. Transistor characteristics and amplifier design 20%
5. General Characteristics of single stage transistor amplifiers 20%
6. Current mirrors 10%

Course Objectives:
1. To teach proper operation of laboratory equipment including signal generators, meters, oscilloscopes, and curve tracers
2. To teach measurement and troubleshooting techniques
3. To teach experimental design and planning
4. To teach practical device limitations that can affect design specifications
5. To teach record keeping and data analysis skills
6. To teach skills in reporting results in the form of intelligent written discourse
7. To teach skills in sharing responsibility with a lab partner
Professional Components/Course Outcomes:  

By the end of this course the student will be able to:

1. demonstrate the ability to perform simple electronic designs.
2. demonstrate the ability to perform experiments, tests, and measurements.
3. demonstrate the ability to predict, analyze, and interpret results.
4. demonstrate the ability to keep accurate data and records.
5. demonstrate the ability to convey the results to others.
6. demonstrate the ability to share tasks with a lab partner.

Class/Lab Schedule:

3 laboratory hours per week, one session  
1 credit hour

Relation to Program Outcomes:

- ☒ (a) Fundamental math, science, or engineering
- ☒ (b) Experimentation
- ☒ (c) Design
- ☒ (d) Teamwork
- ☒ (e) Problem solving
- ☐ (f) Professional ethics
- ☒ (g) Communication
- ☒ (h) Global awareness
- ☐ (i) Life-long learning
- ☐ (j) Contemporary issues
- ☒ (k) Modern tools

Computer Tools:

SPICE, MATLAB, Digilent Electronics Explorer, Microsoft Excel.

Laboratory Content:

See Course Topics

Design Content:

Design issues are addressed.

Relation to Curriculum:

Curricular Component  ☐ Elect. Power/Power Syst.  ☐ Computer  
Math/Science  ☒ EM/Circuits/Elect./Filters  ☐ Controls/Automation  
Design  ☐ Comm. Syst./Signal Proc.  ☐ Other Engineering  
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